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Federal Communications Commission
Washington, D.C. 20554

Dear Sirs:

I'm writing this letter in regards to ET Docket No. 92-298 which is before the Commission (filed 5 Apr 1993).

I totally agree with this docket because it does state many truths as to the inflated claims that are present in the NPRM FCC 92-546, which proposes the C-Quam system as a national AN-STEREO standard.

I specifically agree with this docket in regards to the occupied spectrum, platform motion, unsuitability above one megahertz and proposed station count.

In regards to the occupied spectrum as specified in NRSC-2, the C-QUAM system fails to meet the bandwidth as well as the skirt selectivity requirements as specified in the standard while operating in full stereo. The other problem, which to the average broadcaster would seem more severe, is the reduction in effective modulation and increased distortion as recieved on a normal radio that the average consumer owns. As an example of the occupied bandwidth problem one of our local broadcasters operating on 1140KHz namely KLUC-AM (formally KRSR and prior to this was known as KMJJ) broadcasted using this system. Prior to using the C-Quam system the reception for KSL-AM operating on 1160KHz was adequate. At that time KLUC-AM was using standard methods of processing with normal filtering at 15KHz. The interference was limited to high frequency notes that were pre-emphasized and clipped. Even this interference was far better than when they later went in stereo. When they went to stereo using the C-Quam system the reception of KSL-AM on 1160 was completely destroyed not only did the high frequency trash overwhelm the signal but now so did the regular stereo music. The requirement to use NRSC-1 didn't help the situation much. The interference in mono was much improved but in stereo the interference was the same or worse. Now that KLUC has ceased using the C-Quam system the reception of KSL has been completely restored even to less than one mile of KLUC. According

Comments on BT Docket 92-298 continued,

is present (especially high separation stereo as transmitted by KLUC) the modulation products extended well beyond KSL's frequency. This was also true for the other stations in this community that used this system, namely KENO, KFMS-AM, KVEG, KMTW and KKOW (formally KROL).

Of these stations only KFMS is presently using this system (only to light the stereo light that allows the radios that are able to receive the system to go to wideband therefore giving them a small competitive edge on those receivers during the daytime).

KKOW (formally KROL) was unable to use the C-Quam system because of the mutual cochannel interference caused by their synchronous operation in Laughlin and Henderson Nevada. This station now uses a method called close lock as opposed to locked. In the close locked mode the two carriers are within 1/2 Hz of being locked. This produces a condition of traveling nulls. These nulls are created by phase nulls produced by the two carriers. These traveling phase shifts are what create platform distortion that is a feature of the C-Quam system in a cochannel condition. To combat this KKOW tried to go to full lock. This produced three effects. The first was the stationary nulls which were never in the most opportune locations. The next was the full left full right or full right full left swing as you passed through the null or the offset stereo image when stationary. The last was the white noise that was added to the signal by the phase lock process used between sites. To reduce the white noise would require a link for the phaselock signal that was impossible even under the best conditions. Therefore they elected to not go into stereo. They never tested the ISB system due to lack of receivers so much for fairness.

As for KMTW they discontinued using C-Quam stereo due to loss of mono modulation in stereo and loss of coverage especially at night (they operate on 1340 as a class 4) where severe cochannel occurs. When the listeners complained of poor reception after they went to stereo they decided to discontinue stereo in favor of better coverage and reduced listener complaints.

KENO and KVEG both gave up on C-Quam stereo because of the disadvantages of the C-Quam system already stated and format changes to talk radio. Since there is no perceived need for stereo while broadcasting mono talk programs as well as the severe limitations when using the C-Quam mode without stereo broadcasting these stations have chosen not to use it. If it didn't cause some receivers to go wideband I have my doubts that KFMS would be using the C-Quam system either.

I find the statement of 'a majority of stations are using the C-Quam system hard' to believe. In using a C-Quam only receiver at night, in our area, I find a grand total of 4 stations out of 82 stations that light the 'LITE' as they say. Of these only one is in our area. This is, at least in my area, only 4.9% as I see it and this is far from the 12+% that is claimed.

Comments on ET Docket 92-298 continued,

Of these 4 stations only one was in stereo with music the rest were in mono broadcasting the stereo pilot. I don't think the other three should be counted. This then makes the count more like 1.2% which is one tenth of the stations. So much for number superiority that is claimed for C-Quam.

The statement made by KAHN of platform motion even with a weak cochannel is true, as is the problem of adjacent channel interference, that is not mentioned, being folded into the channel of interest by the reciever. This is true in normal mono but is especially true in C-Quam stereo. The platform motion as described by KAHN is both real and unacceptable both to myself and others. The cochannel interference with C-Quam either produces a left right wobble or the cochannel interference moves in the ~~backwards~~ between left and right or right and left and thus

Comments on ET Docket 92-298 continued,

strength varies but does not cancel out but the modulation goes from clean to severely distorted. With powerside the distortion is reduced to near non-existence. The same occurs for antenna nulls as well as re-radiation distortion for stations in there local area as was demonstrated by KLAV in Las Vegas. Powerside is usable for reduction of cochannel interference and would solve the synchronous null troubles of KKOW that the C-Quam system was unable to solve no matter what mode was used. This was checked using a ISB reciever while traveling between the sites in Laughlin and Henderson.

Therefore I agree with KAHN that the commission is in error in trying to make the C-Quam system the standard. Making the ISB system the standard would be appropriate because it would not penalize the broadcaster nor the consumer by inflicting either with inferior technology that is severely limited in use and in capability. Also since the C-Quam system uses patents held by KAHN it's long term viability is seriously in question. The last is that the ISB system would be the only viable system for use in HF (shortwave) broadcasting both with powerside and with full stereo. This is true since the HF stations that use SSB use a form of this system already. The method is called 'Single sideband transmission by Envelope Elimination and Restoration' and is printed in the proceedings of the IRE (the predecessor to the IEEE) volume 40 no.7 in July 1952. This High Powered SSB method using a standard AM transmitter was pioneered by KAHN in 1951 to improve the then poor efficiency of SSB transmitters used in the AT&T trans-Atlantic telephone links. This method of generating High Power SSB signals has proven itself over many years and is still the only method of efficient High Power SSB transmitter operation. This was admitted to and stated as being used by Continental Electronics in their most recent catalogue. Continental is a maker of some of the highest powered AM and SSB transmitters in the world. This should be considered as a great testimony to this form of technology. Even the introduction of a modified version called ISB stereo pre-dated any of the other systems by years and was in full operation in 1959 this is some twenty years ahead of any of the other systems. None of the other systems has the capabilities that this system nor it's robustness.

As stated by KAHN and I agree, I think the commission should reevaluate it's NPRM in terms of the law as well as by technical consideration of overall capability. This decision to make C-Quam as the national standard is irresponsible as well as fulhardy and should be reconsidered. If the commission is technically inept to be able to judge the technical merits of the system as they so previously stated, then the commission should as KAHN suggested contact the National Institute of Science and Technology at Boulder Colorado to evaluate the system as well as the other ancillary capabilities of the ISB system verses the single capability of the C-Quam system.

Comments on ET Docket 92-298 continued,

As KAHN stated and I reiterate **AM RADIO** deserves the **BEST** and most **COMPREHENSIVE** technology available. Stereo is important but **AM** needs the other capabilities that ISB offers. Therefore in my opinion this **BEST** and **MOST COMPREHENSIVE** technology is in ISB and is NOT to be found in the C-QUAM system!

Respectfully yours,



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